

DROSOPHILA HEDGEHOG	R C K E K L N V L A Y S V M N E W P G I R L L V T
CHICKEN HEDGEHOG-A	R C K E R V S L A I A V M H M W P G V R L R V T
CHICKEN HEDGEHOG-B	R C K D K L N A L A I S V M N Q W P G V K L R V T
DROSOPHILA HEDGEHOG	E S W D E D Y H H G Q E S L H Y E G R A V T I A T
CHICKEN HEDGEHOG-A	E G W D E D G H H P D S L H Y E G R A L D I T T
CHICKEN HEDGEHOG-B	E G W D E D G H H S E E S L H Y E G R A V D I T T
DROSOPHILA HEDGEHOG	S D R D Q S K Y G M L A R L A V E A G F D W V
CHICKEN HEDGEHOG-A	S D R D R H K Y G M L A R L A V E A G F D W V
CHICKEN HEDGEHOG-B	S D R D R S K Y G M L A R L A V E A G F D W V

FIGURE 1

1 H D H I S S V P H A S A A S V T C L S L D A K C H S S S S S S S K S A A S S I CHICKEN SONIC HEDGEHOG  
 1 H V E H L L L T R I L L V G F I C A L L V S CHICKEN SONIC HEDGEHOG  
 41 S A I P Q E E T Q T H R H I A H T Q R C L S R I U T S L V A L L L I V L P H V F S DROSOPHILA HEDGEHOG  
 23 S C L T C C G P G R C I G K R R H P K K L T P L A Y K O F I P H V A E K T L G A S CHICKEN SONIC HEDGEHOG  
 81 P A H S C C G P G R G L G R H H - A R H I Y P L V Z K O T I P N L S E Y T H N S A S DROSOPHILA HEDGEHOG  
 63 C R Y E C K I T R A N S E R P K E L T P H Y N P D I I F K D E E N T G A D R L H T CHICKEN SONIC HEDGEHOG  
 120 Q P L E G V U R A D S P K F K D I V P L Y N R D I L E R D E P E G T G A D R I N S DROSOPHILA HEDGEHOG  
 163 Q R C K D K L H A L A I S V H N O H P C V K L R V T E C H D E D C I I I S E E S I CHICKEN SONIC HEDGEHOG  
 160 K R C K E K L H V L A Y S V H N E H P C I R I L V T E S H D E D Y I I I C Q E S I DROSOPHILA HEDGEHOG  
 143 H Y E C R A V D I T T S D R D R S K Y O H L A R L A V E A G P D H V Y Y E S K A CHICKEN SONIC HEDGEHOG  
 200 H Y E C R A V T I A T S D R D R S K Y O H L A R L A V E A G P D H V S Y V S R R DROSOPHILA HEDGEHOG  
 183 H I I C S V K A E N S V A A K S G O C F P O S A T V I L E H O O T K L V K D L S CHICKEN SONIC HEDGEHOG  
 240 H I I C S V K S D S S I S S I V I O C F T P E S T A L L E S G V R K P L O E L S DROSOPHILA HEDGEHOG  
 223 F G D R V I A A D A D C R L L Y S D F L T F L D R H D S S R K L F Y V I E T R Q CHICKEN SONIC HEDGEHOG  
 200 F G D R V I L S H T A N G Q A V Y S E P V I L E H D R H N L E Q H Q N E V O L H T - D DROSOPHILA HEDGEHOG  
 263 P H [A] R [T] L L T A [A] H T L F V A P Q H N Q S E A T Q S T S O Q A I F A S H V K P CHICKEN SONIC HEDGEHOG  
 319 Q C A V U I T V T F A U I V S Y H Q - - - - - P E S Q K L T F V E A D R I E E DROSOPHILA HEDGEHOG  
 303 G O R V Y V L G E C C O Q L L P A S V I I S V S L R E E A S C A Y A P L T A O G T CHICKEN SONIC HEDGEHOG  
 352 K H Q Y I V R D V E T O E L R P Q R V V K V G - S V R S K G V V A P I T R E G T DROSOPHILA HEDGEHOG  
 343 I I I I R V L A S C Y A V I E E H S H A I I H A F A P F R L A Q G L - - L A A - CHICKEN SONIC HEDGEHOG  
 391 I V V I I S V A A S C Y A V I N S Q S L A I H G L A P H R I L S T H E A H U P A K DROSOPHILA HEDGEHOG  
 379 - - L C P D G A I P T A A T T T T O I H Y S R L Y R I C S H V L D O D A L H CHICKEN SONIC HEDGEHOG  
 431 E Q L H I S S P K V V S S A Q Q Q H O I H Y A N A L Y X V K D Y V I P Q S H R W DROSOPHILA HEDGEHOG  
 417 F I G H V A P A S  
 471 D CHICKEN SONIC HEDGEHOG  
 DROSOPHILA HEDGEHOG

FIGURE 2

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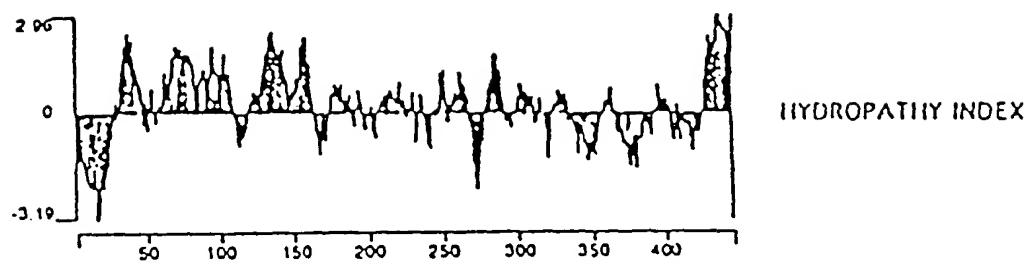


FIGURE 3

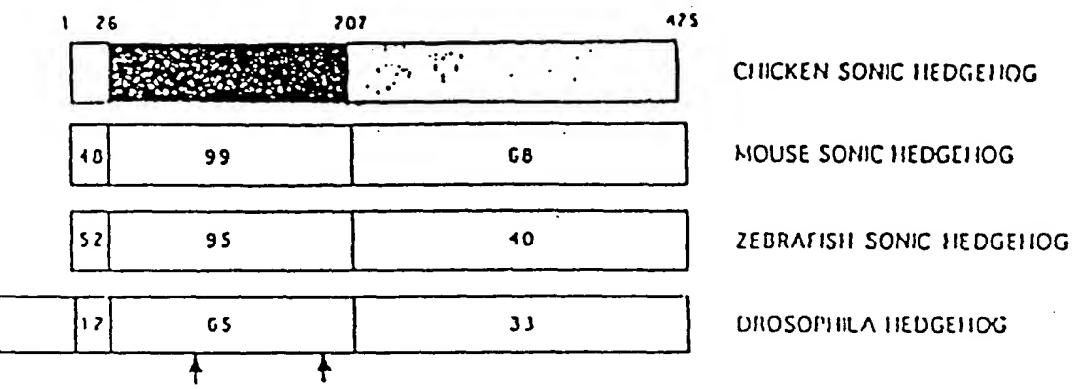


FIGURE 4

2020-04-22 16:58:00

b-hh	MDNHSSVPWA	SAASVTCLSL	DAKCHSSSS	SSSKSAASSI	SAIPQEEETQT
M-Dhh	.....	.....	.....	.....	.....
M-Ihh	.....	.....	.....	.....	.....
M-Shh	.....	.....	.....	.....	.....
C-Shh	.....	.....	.....	.....	.....
Z-Shh	.....	.....	.....	.....	.....
	51				
D-hh	MRHIAHTQRC	LSRLTSLVAL	LLIVLPMVFS	PAHSCGPGRC	LGRHR...AR
M-Dhh	.....	..MALPASLL	PLCLALLAL	SAQSCGPGRC	PVGRRYYVRK
M-Ihh	.....	.....	.....	.....	.....
M-Shh	.....	MLLLARCFZ	VILASSLLVC	PGLACGPGRC	FGKRRH..PK
C-Shh	.....MV	EMLLTRILL	VGICALLVS	SGLTCGPGRC	IGKRRH..PK
Z-Shh	.....	..MRLLTRVLL	VSLLTLSLVV	SGLACGPGRC	YGRRRH..PK
	101				
D-hh	NLYPLVLKQF	IPNLSEYTN	ASGPLEGVIR	RDSPKFKDLY	PNYNRDILPR
M-Dhh	QLVPLLYKQF	VPSMPERTLG	ASGPAEGRVT	RGSERFRDLV	PNYNPDIIFK
M-Ihh	.....	.....	.....	..ERPKELT	PNTNPDIIIFK
M-Shh	KLTPLAYKQF	IPNVAEKTG	ASGRYEGKIT	RNSERPKELT	PNYNPDIIFK
C-Shh	KLTPLAYKQF	IPNVAEKTG	ASGRYEGKIT	RNSERPKELT	PNYNPDIIFK
Z-Shh	KLTPLAYKQF	IPNVAEKTG	ASGRYEGKIT	RNSERPKELT	PNYNPDIIFK
	151				
D-hh	DEEGTGADRL	MSKRCKEKLN	VLAISVMNEW	PGIRLLVTZG	WDZDYHHCQE
M-Dhh	DEENSGADRL	MTERCKERVN	ALAIAVMNW	PGVRLRVTZG	WDZDGHBAQD
M-Ihh	DEENTGADRL	MTQRCKDRLN	SLAISVMNQW	PGVRLRVTZG	RDEDGHESEE
M-Shh	DEENTGADRL	MTQRCKDKLN	ALAIISVMNQW	PGVRLRVTZG	WDZDGHHESEE
C-Shh	DEENTGADRL	MTQRCKDKLN	ALAIISVMNQW	PGVRLRVTZG	WDZDGHHESEE
Z-Shh	DEENTGADRL	MTQRCKDKLN	SLAISVMNHW	PGVRLRVTZG	WDZDGHHESEE
	201				
D-hh	SLHYEGRAVT	IATSDRDQSK	YGMLARLAVE	AGFDWVSYVS	RRHIYCSVKS
M-Dhh	SLHYEGRALD	ITTSDRDRNK	YGLLARLAVE	AGFDWVYYES	RNHIHCSVKA
M-Ihh	SLHYEGRADV	ITTSDRDRNK	YGLLARLAVE	AGFDWVYYES	KAHICSVKS
M-Shh	SLHYEGRADV	ITTSDRDRSK	YGMLARLAVE	AGFDWVYYES	KAHICSVKA
C-Shh	SLHYEGRADV	ITTSDRDRSK	YGMLARLAVE	AGFDWVYYES	KAHICSVKA
Z-Shh	SLHYEGRADV	ITTSDRDKSK	YGTLSRLAVE	AGFDWVYYES	KAHICSVKA
	251				
D-hh	DSSISSHVHG	CPTPESTALL	ESGVRKPLGE	LSIGDRVLSM	TANGOAVYSE
M-Dhh	DNSLAVRAGG	CPPGNATVRL	RSGERKGLRE	LHGDWVLA	DAAGRUVPTP
M-Ihh	EHSAAAKTGG	CPPAGAQVRL	ENGervalSA	VKPGDRVIA	GEDGPTPTFSD
M-Shh	ENSVAAKSGG	CPPGSATVHL	EQGGTKLVKD	LRPGDRVLA	DDQGRLLYSD
C-Shh	ENSVAAKSGG	CPPGSATVHL	EHGGTKLVKD	LSPGDRVLA	DADGRLLYSD
Z-Shh	ENSVAAKSGG	CPPGSALVSL	QDGGQKAVKD	LNGDKVLA	DSAGNLVFSD
	301				
D-hh	VILPMDRNLE	QMQNPFVQLHT	DGGAVLTVT	PAHLVSVWQ	.....PESQ
M-Dhh	VLLFLDRDLO	RRASFVAVET	ERPPRKLLLT	PWHLVFAAR	...GPAPAPG
M-Ihh	VLIIFLDRDPE	RKRAFPQVIET	ODPDRRLALT	PAHLLFIADN	HTE...PAA
M-Shh	FLTFLDRDEG	AKKVFYVIET	LEPRARLLLT	AAHLLFVAP	HNDSGPTPGP
C-Shh	FLTFLDRMDS	SRKLFYVIET	RQPRARLLLT	AAHLLFVAPQ	HNOSEATGST
Z-Shh	FIMPTDRDST	TRRVFYVIET	QEPVEKITLT	AAHLLFVLDN	STEDLHTMT
	351				
D-hh	KLTFVFADRI	EEKNQVLV..	RDVETGELRP	QRVVKVG..SV	RSKGUVAPLT
M-Dhh	DFAPVFARRL	RAGDSVLA..	..PGGDALQP	ARVARVA..RE	EAVGVFAPLT
M-Ihh	HFRATFASHV	OPGQYVLLV..	..SGVPGLOP	ARVAAVS..TH	VALGSYAPLT
M-Shh	S..ALFASRV	RPGQRVYVVA	ERGGDRRLLP	AAVHSVTLRE	EEAGAYAPLT
C-Shh	SGCQALFASNV	KPGQRVYVLG	E..GGQQLLP	ASVHSVSRE	EASGAYAPLT
Z-Shh	...AAYASSV	RAGQKVMVVD	DSGQLKSVIV	QRIYT...E	EQRGSFAPVT
	401				
D-hh	RECTIVVNSV	AASCYAVINS	QSLAHWGLAP	MRLLSTLEAW	LPAKEQLHSS
M-Dhh	AHGTLLVNDV	LASCYAVLES	HQWAHRAFAP	LRLLHALGAL	LP.....
M-Ihh	RHTGLVVVEDV	VASCFAAVAD	HHLAQLAFWP	LRLFPLS	.....
M-Shh	AHGTILINRV	LASCYAVIEE	HSAWAHRAFAP	FRLAHALLAA	LAPARTDGGG
C-Shh	AQGTILINRV	LASCYAVIEE	HSAWAHWAFA	FRLAQCLLAA	LCP.....
Z-Shh	AHGTIVVDR	LASCYAVIED	QGLAHLAFAP	ARLYYYVSSF	LSP.....
	451				
D-hh	PKVV.....	...SSAQQN	GIHWYANALY	KVKDYVLPQS	WRHD*
M-Dhh	.....	...GGAVQPT	GMHWYSRLLY	RRAEELMG*	
M-Ihh	.....	..AWGWSWPSE	GVHSYPQMLY	RIGRLLLEES	TFHPLGMSGA
M-Shh	GGSIPAAQSA	TEARGAEPTA	GIHWYSRLLY	HIGTWLLDSE	RHMPLGMAVK
C-Shh	DGAIPTA...	....ATTIT	GIHWYSRLLY	RIGSWVLDGD	ALHPLGMVAP
Z-Shh	KTPAVGPMRL	YNRRGSTGTP	GSC.....H	QMGTWLLDSN	MLHPLGMSVN
	501				
M-Ihh	GS				
M-Shh	SS				
Z-Shh	AS				
Z-Shh	SS				

FIGURE 5A

Figure 5B

	M-Dhh	M-Ihh	C-Shh	Zf-Shh	D-hh
M-Shh	61 (77)	63 (78)	84 (92)	68 (80)	48 (64)
M-Dhh		58 (75)	61 (77)	54 (71)	51 (68)
M-Ihh			64 (78)	61 (75)	48 (68)
C-Shh				68 (80)	49 (64)
Zf-Shh					47 (64)

FIGURE 6

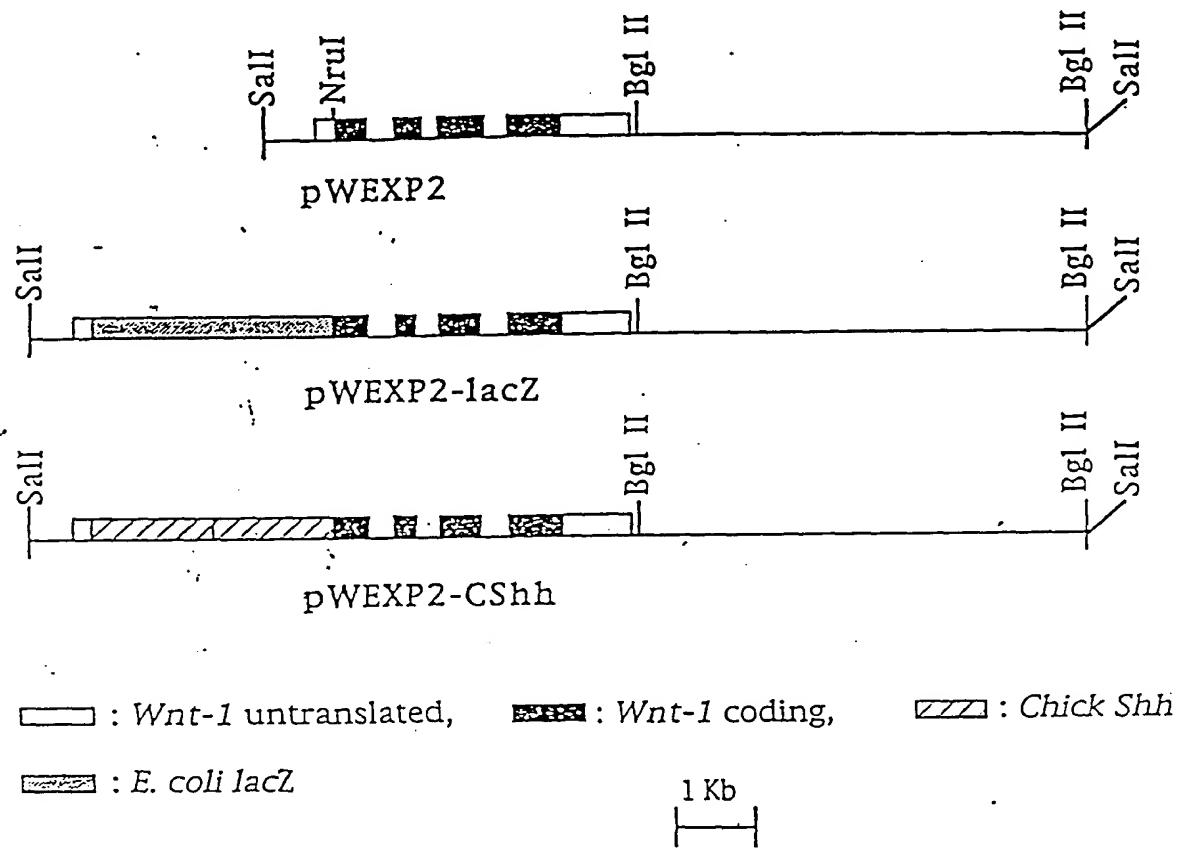


FIGURE 7

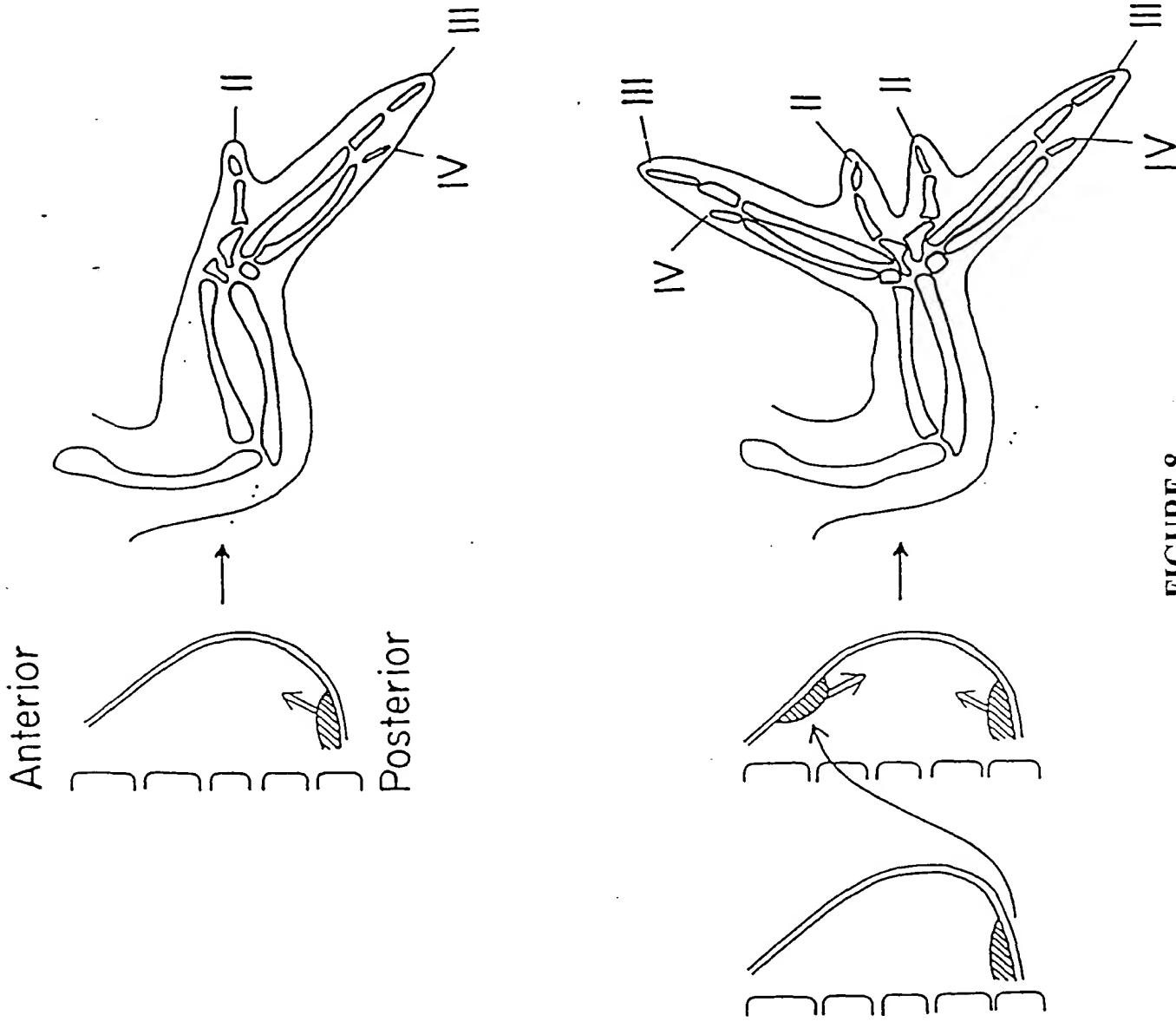


FIGURE 8

2600-1224-0000

hh 1 MDNHSSVPWASAASVTCLSLDAKCHSSSSSSSSKSAASSISAIPQEETQT  
 shh .....  
 hh 51 MRHIAHTQRCLSRLTSLVALLLIVLPMVSPAHSCGPGRGLGRHR.ARNL  
 shh 1 .....MRLLLTRVLLVSLLTLSVVS.GLACGPGRGYGRRRHPKKL  
 hh 100 YPLVLKQTIPNLSEYTNSASGPLEGVIRRDSPKFDLVPNYNRDILFRDE  
 shh 40 TPLAYKQFIPNVAEKTLGASGRYEGKITRNSERFKELTPNYNPDIIFKDE  
 hh 150 EGTGADRLMSKRCKELNVLAYSVMNEWPGIRLVVTEWDEDYHHQESL  
 shh 90 ENTGADRLMTQRCDKLNSLAISVMNHWPGVKLRVTEGWDEDGHFESL  
 hh 200 HYEGRAVTIATSDRDQSKYGMLARLAVEEAGFDWSYVSRRHIYCSVKSDS  
 shh 140 HYEGRAVDITTSDRDKSKYGTLSRLAVEEAGFDWVYYESKAHICSVKAEN  
 hh 250 SISSHVHGCFTPESTALLESGVRKPLGELSIGDRVLSMTTANGQAVYSEVI  
 shh 190 SVAAKGGCFPGSALVSLQDGGQKAVKDLNPGDKVLAADSAGNLVFSDFI  
 hh 300 LFMDRNLEQMQNFVQQLHT.DGGAVLTVTPAHLVSVWQPEQQKL...TFVF  
 shh 240 MFTDRDSTTRRVFYVIETQEPVEKILTAAHLLFVLDNSTEDLHTMTAAY  
 hh 347 ADRIEEKNQVLVRDVETGELRPQRVVKGSVRSKGVVAPLTRGTIVVNS  
 shh 290 ASSVRAGQKVMVVD.DSGQLKSVIVQRIYTEEQRGSFAPVTAHGTIVVDR  
 hh 397 VAASCYAVINSQSLAHWGLAPMRLLSTLEAWLPAKQL.....HSS  
 shh 339 ILASCYAVIEDQGLAHLAFAPARLYYVSFLSPKTPAVGPMRLYNRGS  
 hh 438 PKVVSSAQQQNGIHWYANALYKVKDYVLPQSWRHD 471  
 shh 389 TGTPGSCHQMGTWLDSNMLHPLGMSV..... 415

FIGURE 9A

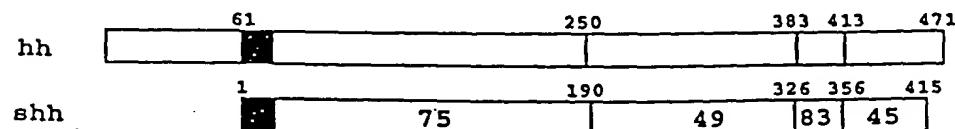


FIGURE 9B

FIGURE 10

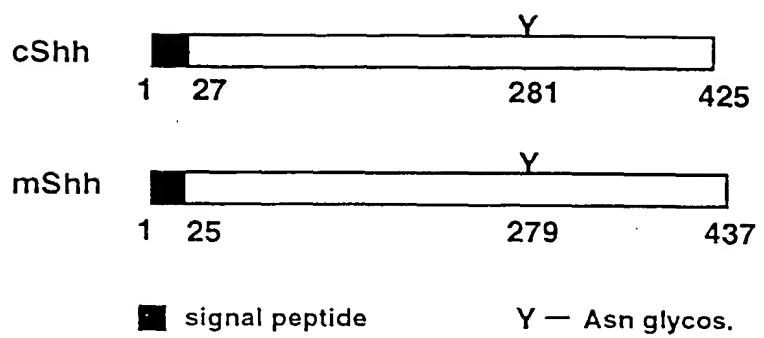
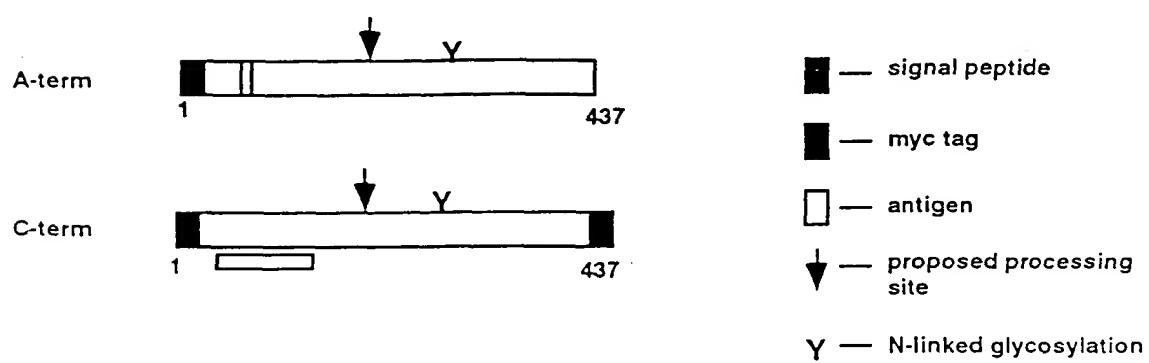


FIGURE 11



**FIGURE 12**

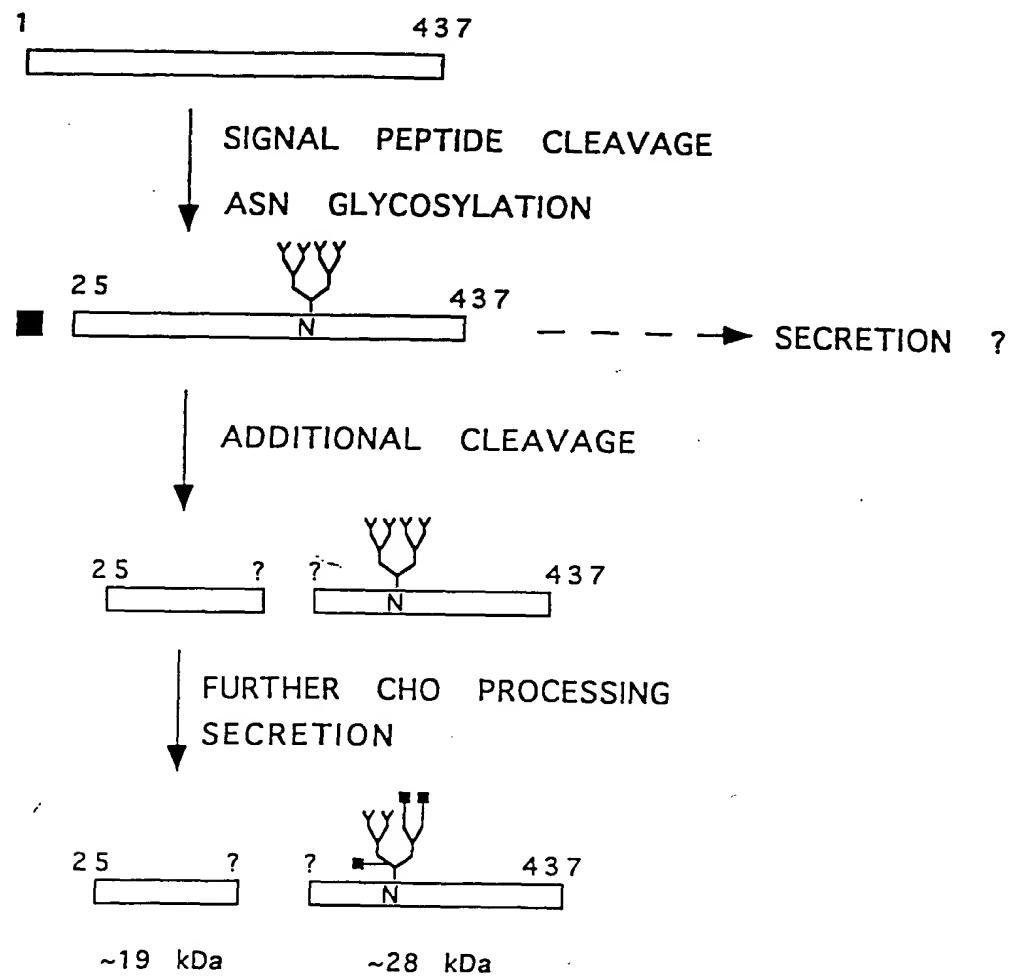


FIGURE 13

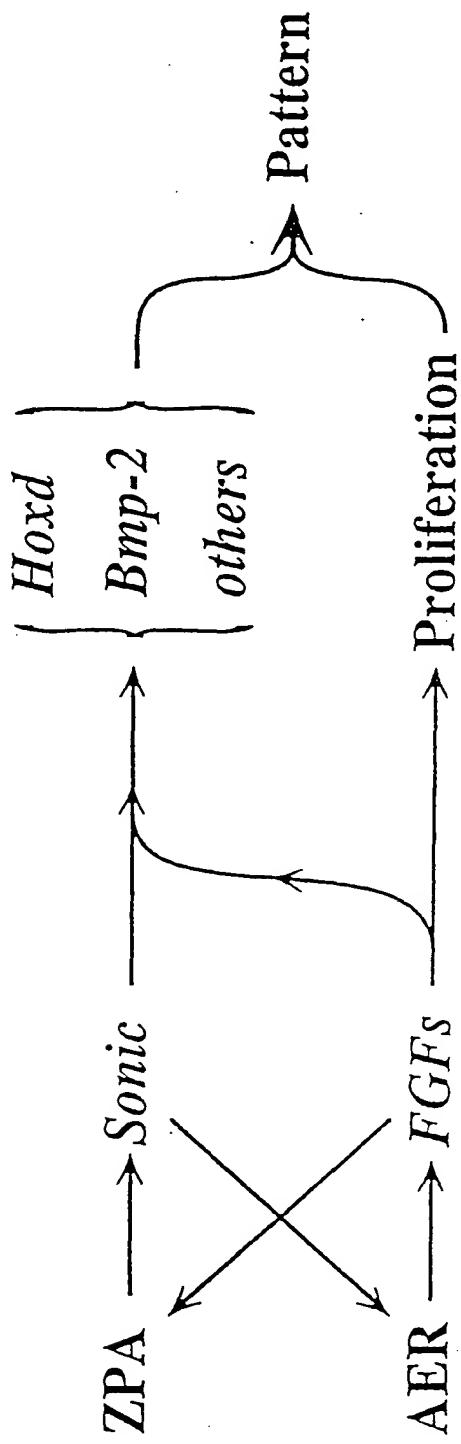


FIGURE 14

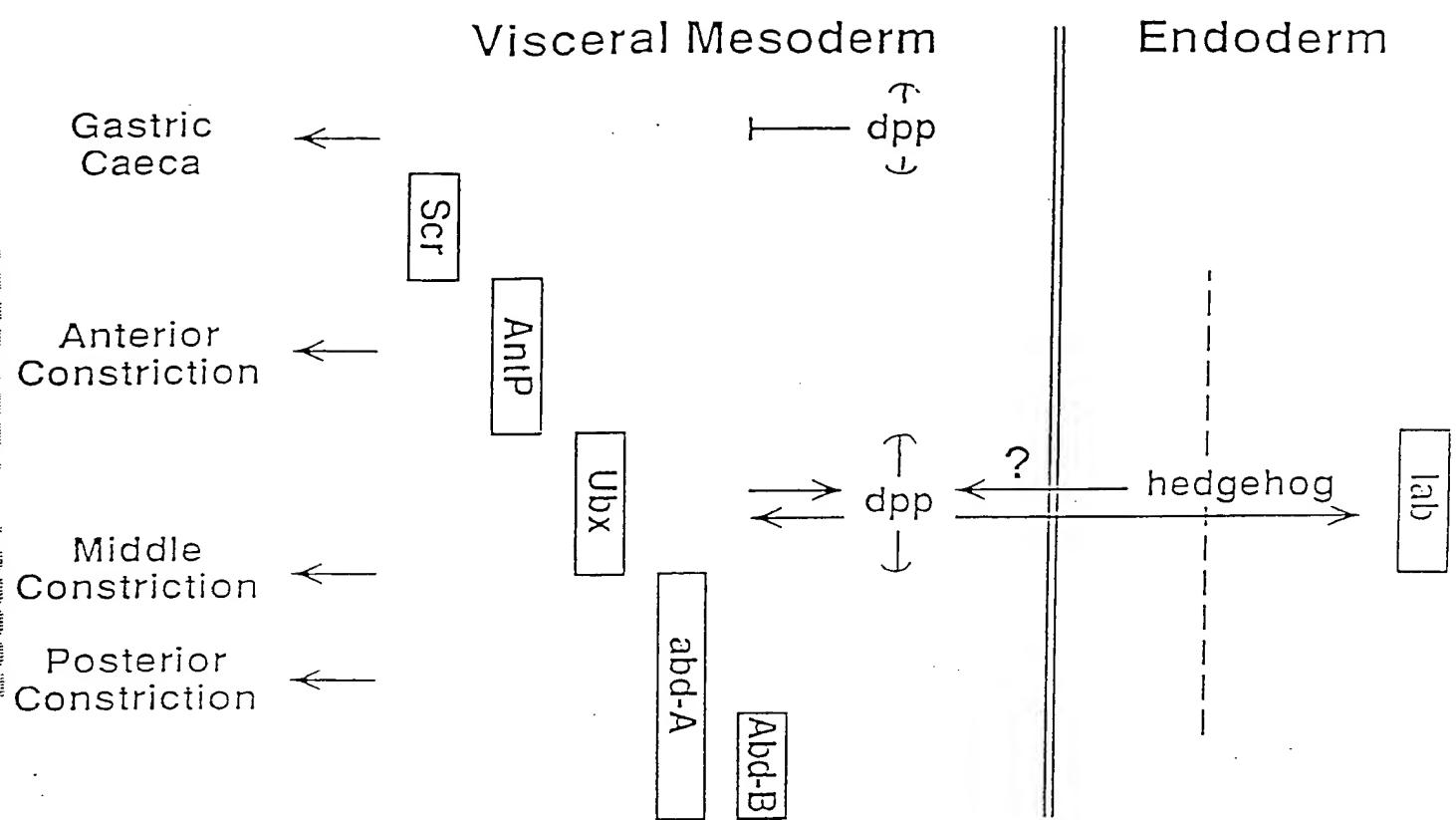


FIGURE 15A

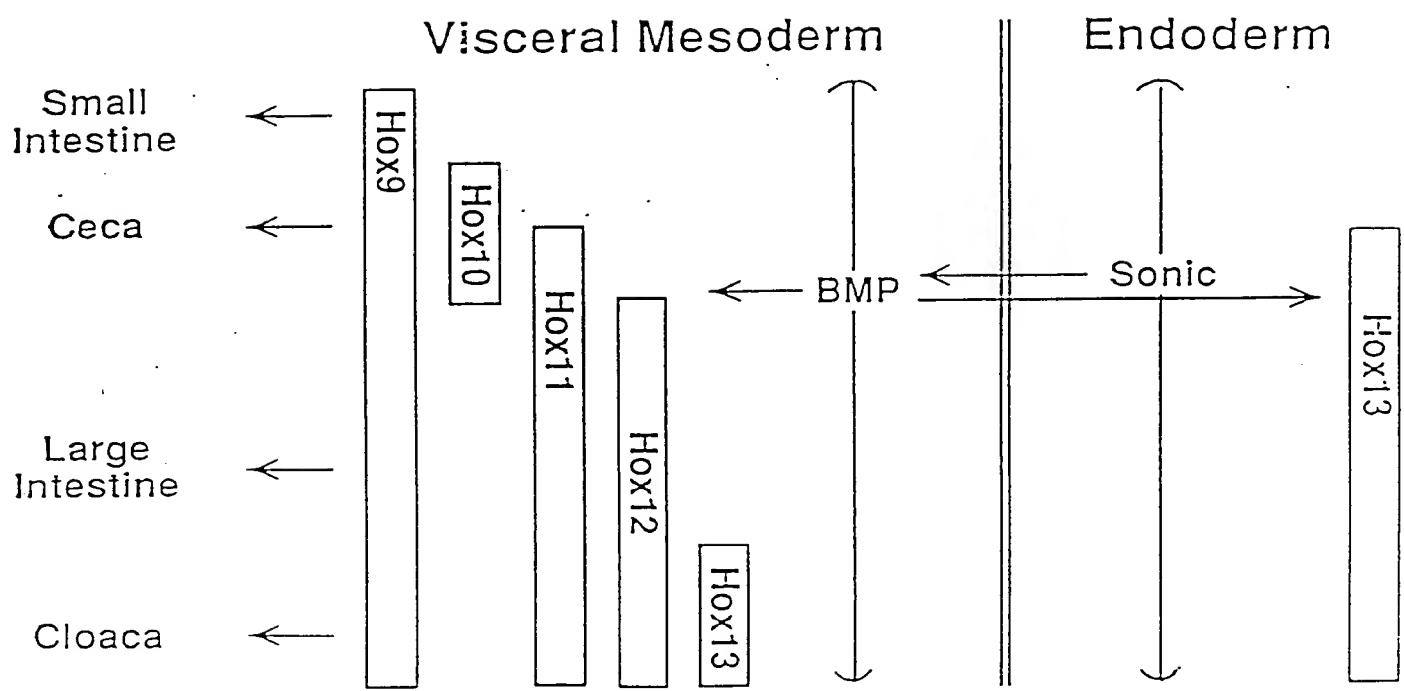


FIGURE 15B

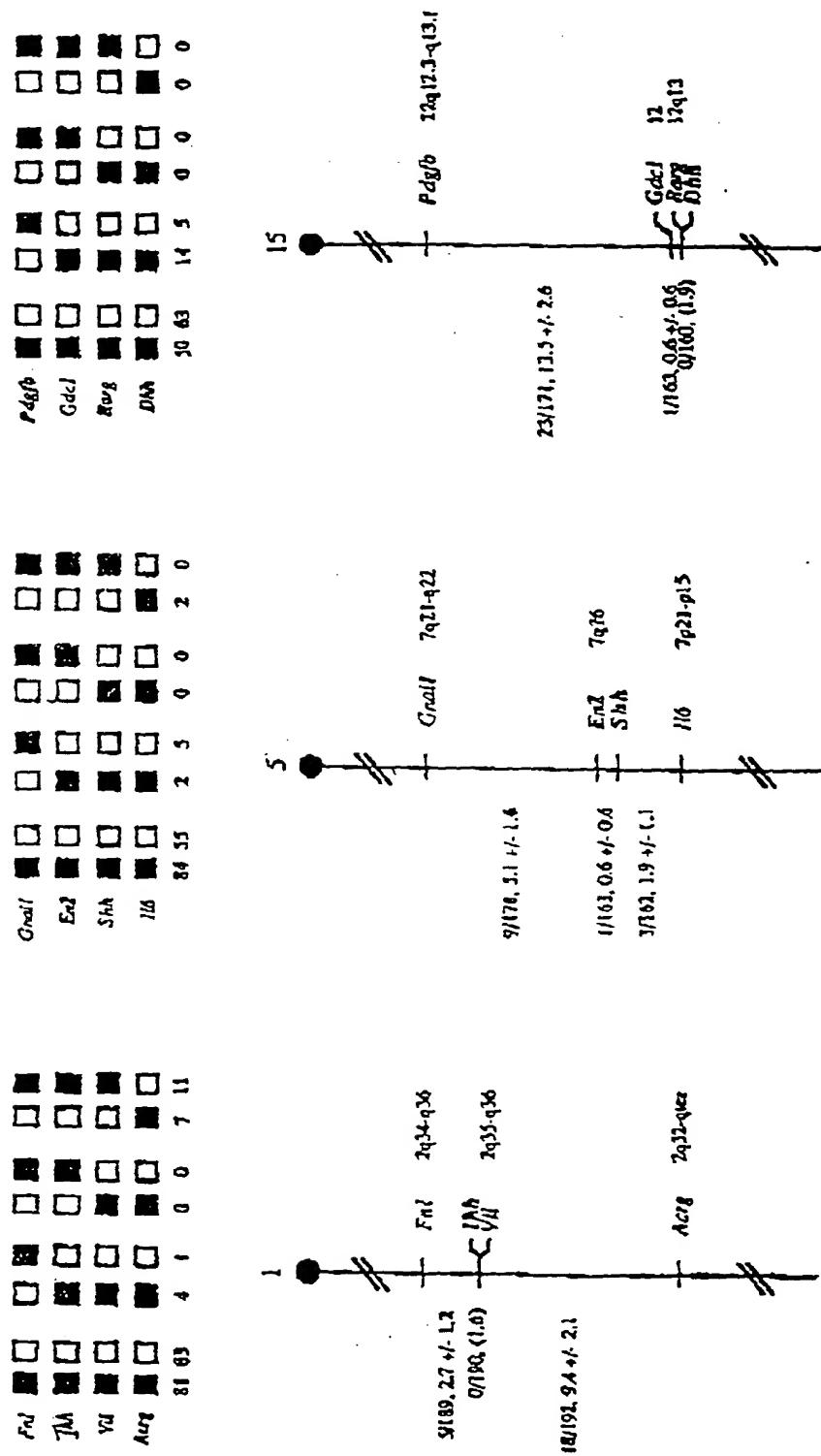


FIGURE 16